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analysis situs, mathematical logic, research regarding axioms). Most of the articles are in French, and the use of languages other than English, French, Italian and German is disallowed.

The first volume opens with a portrait frontispiece, and a brief sketch, of ZYGMUNT JANISZEWSKI, the founder of the journal, and a member of the editorial board. He was born at Warsaw July 12, 1888, became doctor de l'Université de Paris in 1911, maître de conférence in mathematics at the University of Leopold in 1913, and professor at the University of Warsaw in 1919. He died January 3, 1920. A list of his publications is given. The volume contains also 24 articles or notes by 8 authors, and 10 proposed problems.

In the second volume there are 30 articles or notes by 13 authors, and 6 more problems. The last article, 256–285, "Sur les correspondances entre les points de deux espaces," is by H. Lebesgue.

The chief editors of the volumes are STEFAN MAZURKIEWICZ and WACLAW SIERPINSKI, professors of mathematics at the University of Warsaw. The periodical is excellently printed on good paper, royal octavo size. Subscriptions to the volumes (15 French francs) may be sent to *Fundamenta Mathematicae*, Mathematical Seminary, University of Warsaw, Warsaw, Poland.

In 1912 it was arranged that the collected papers of Sophus Lie should be assembled under the general direction of Friedrich Engel, and published by Teubner in about seven large volumes. On account of the great increase in cost of publication, the undertaking would have fallen through had not the Norwegian mathematical union (Norsk Matematisk Forening) laid the matter before the committee on the research fund of three million crowns voted by the Norwegian Storting in 1919. As Engel writes, in the last number of the *Jahresbericht der deutschen Mathematiker Vereinigung*, Bäcklund of Lund, Bianchi of Pisa, Hjelmslev of Copenhagen, Klein of Göttingen, Study of Bonn, Veblen of Princeton, and Vessiot of Paris, united in stating that the publication of the collected papers of Sophus Lie was not only highly desirable but also necessary. As a result, the committee of the Storting fund voted 5000 crowns a year for four years, beginning with 1921, to assist in carrying the undertaking to a successful conclusion, which is now assured. Professor Poul Heegaard, of the University of Christiania, is to be one of the editors. It is expected that the first published volume, the third of the set, will be issued during 1921. The tentative title page of the edition is: SOPHUS LIE, *Gesammelte Abhandlungen, im Auftrage des Norwegischen Mathematischen Vereins und mit Unterstützung der Akademien zu Kristiania und Leipzig herausgegeben von Friedrich Engel und Poul Heegaard.*

ARTICLES IN CURRENT PERIODICALS.

BULLETIN OF THE AMERICAN MATHEMATICAL SOCIETY, volume 27, no. 5, February, 1921: "The thirteenth regular meeting of the southwestern section" by L. Ingold, 197–200; "A remark on skew parabolas" by G. Loria, 201; "The pseudo-derivative of a summable function" by W. L. Hart, 202–211; "Note on minimal varieties in hyperspace" by C. L. E. Moore, 211–216; "Notes on electrical theory" by H. Bateman, 217–225; Review by D. N. Lehmer of E.

Lebon's *Table de Charactéristiques de Base 30030, donnant en un seul coup d'œil les facteurs premiers des nombres premiers avec 30030 et inférieurs à 901,800,900.* Tome I, Premier Fascicule (Paris, 1920), 225–227; Reviews by D. E. Smith, of G. Loria's *Newton* (Rome, 1920), 228–230, and of T. L. Heath's *Archimedes* (London, 1920), 232–234; Reviews by R. D. Carmichael of W. Ahrens's *Mathematiker Anekdoten* (2d edition, Leipzig and Berlin, 1920), 230–231, and of G. Giraud's *Leçons sur les Fonctions automorphes* (Paris, 1920), 231–232; Review by V. Snyder of J. L. S. Hatton's *The Theory of the Imaginary in Geometry together with the Trigonometry of the Imaginary* (Cambridge, 1920), 234–236; "Comment on a previous review" [of Eddington's *Space, Time, and Gravitation,* by E. B. Wilson] by C. N. Moore, 236; Notes, 237–241; New Publications, 242–244—No. 6, March: "The twenty-seventh annual meeting of the American Mathematical Society" by R. G. D. Richardson, 245–265; "Reciprocal subgroups of an abelian group" by G. A. Miller, 266–272; "Proof of an arithmetic theorem due to Liouville" by E. T. Bell, 273–275; "A sequence of polynomials connected with the *n*th roots of unity" by T. H. Gronwall, 275–279; "The minimum area between a curve and its caustic" by P. R. Rider, 279–284; Review by L. W. Dowling of R. Marcolongo's *Il Problema dei Tre Corpi da Newton ai Nostri Giorni* (Milan, 1919), 284–285; Review by V. Snyder of T. Schmid's *Darstellende Geometrie,* volume 1, second edition (Berlin and Leipzig, 1919), 285; Notes, 286–289; New Publications, 289–292—No. 7, April: "The Chicago meeting of the American Mathematical Society" by A. Dresden, 293–308; "Pleasant questions and wonderful effects" [Presidential address delivered before the American Mathematical Society, December 28, 1920] by F. Morley, 309–312; "Fallacies and misconceptions in Diophantine analysis" by L. E. Dickson, 312–319; "On the Fourier coefficients of a continuous function" by T. H. Gronwall, 320–321; "Extension of an existence theorem for a non-self-adjoint linear system" by H. J. Ettlinger, 322–325; "On the Cauchy-Goursat theorem" by R. L. Borger, 325–329; "On a general arithmetic formula of Liouville" by E. T. Bell, 330–332; Review by L. W. Dowling of O. S. Adams's *General Theory of Polyconic Projections* (Washington, United States Coast and Geodetic Survey, 1919, special publication no. 57), 332–333; Review by G. A. Pfeiffer of A. Fraenkel's *Einleitung in die Mengenlehre* (Berlin, 1919), 333–334; Review by E. B. Cowley of E. Kenison and H. C. Bradley's *Descriptive Geometry* (New York, 1917), 334–335; Notes, 336–337, New Publications, 337–340.

L'Education Mathématique, volume 18, January, 1921: "Sur la relation d'Euler" by J. Coissard, 57–58—February: "Sur les cercles d'Apollonius d'un triangle" by A. Julson, 65–66, 73–74.

Financier, New York, volume 116, March 15, 1921: "Is banking a science?" by C. C. Grove, 10–11, 71–73.

Isis, volume 3, no. 1, January, 1920: "The purpose of Zeno's arguments on motion" by F. Cajori, 7–20—No. 2, September: "Did Fermat have a solution of the so-called Pellian equation?" by J. M. Child, 255–262 [Last sentence: "Hence I conclude that Fermat did have a general proof, and that it was substantially what I have given."].

Journal of the Indian Mathematical Society, volume 12, October, 1920: "An algebra of arithmetical functions" (continued) by F. Hallberg, 161–169; "Double points and lines" (concluded) by B. Rao, 170–174; "Invariants of a conic" by G. A. Srinivasan, 175–177; Problems and Solutions, 178–200—December: "An algebra of arithmetical functions" (continued) by F. Hallberg, 201–216; "Singularities of pedal curves" by A. Narasinga Rao, 217–222; Problems and Solutions, 223–240.

Nature, volume 106, February 3, 1921: "Mathematical text-books," 722–723 [review of H. T. H. Piaggio's *An Elementary Treatise on Differential Equations and their Applications* (London. 1920), of C. V. Durell and G. W. Palmer's *Elementary Algebra, Part i* (London, 1920), of R. E. Moritz's *A Short Course in College Mathematics* (New York and London, 1919) and of F. W. Dobbs and H. K. Marsden's *Arithmetic, Part ii* (London, 1920)]—Volume 107, March 3: "Mathematical papers of Huygens" by J. L. E. D[reyer], 4–5 [review of *Œuvres Complètes de Christian Huygens,* vol. 14]—March 10: "Relativity and the velocity of light" by C. O. Bartrum and J. H. Jeans, 42–43; "Relativity and the deviation of spectral lines" by H. J. Priestley, 43—March 24: Review of A. L. Bowley's *Elements of Statistics* (4th edition, London, 1920), 102–103.

Philosophical Magazine, sixth series, volume 41, February, 1921: "Notes on times of descent under gravity, suggested by a proposition of Galileo's" by W. B. Morton and T. C. Tobin, 225–239 [Proposition 36 of the *Dialogues:* A particle which slides to the lowest point O of a vertical circle starting from rest at any point B of the circumference below the level of the center, will make the journey in a shorter time if it moves along two successive chords BA, AO of the circle than if it goes directly along the one chord BO].

PRINTING ART, volume 37, no. 2, April, 1921: "Golden proportions in design" by F. T Singleton, 133–144.

REVUE DE L'ENSEIGNEMENT DES SCIENCES, volume 14, November–December, 1920: "Formules relatives à l'ellipse et à l'hyperbole" by G. Fontené, 193–196; "Sur la composition des vitesses et la composition des accélérations" by P. Montel, 196–199; "Sur deux théorèmes relatifs aux courbes planes algébriques et aux surfaces algébriques" by R. Malloizel, 199–203; "Sur le calcul de π au moyen d'expressions analogues à $4 \text{ arctg } \frac{1}{5} - \text{arctg } \frac{1}{239}$" by A. Lévy, 203–210; "Sur les sommes des puissance semblables des n premiers nombres entiers" by H. Girard, 210–212; "Intersection d'une droite et d'une hyperbole" by J. Angelloz-Pessey, 213–214; "Sur un procédé de Fermat" by J. Angelloz-Pessey, 214–215; "Polaire d'un point par rapport à un cercle" by J. Lemaire, 215; "Note de géometrie descriptive" by J. Juhel-Renoy, 216; "Sur le trapèze harmonique" by C. Michel, 217–218; "Sur l'équation différentielle linéaire du second ordre à coefficients constants" by C. Michel, 218–221; "Examens et concours de 1920," 221–233; Index, 235–236.

REVUE DE MATHÉMATIQUES SPÉCIALES, volume 13, April, 1921: "Sur les hélices cylindriques" by M. Anzemberger, 441–444.

REVUE GÉNÉRALE DES SCIENCES, volume 32, February 28, 1921: "Georges Humbert" by R. d'Adhémar, 97–98 [First paragraph: "Georges Humbert vient de mourir et tous ceux qui l'ont connu regrettent, en lui, le gallant homme, amiable, serviable, au regard vif et bienveillant, et le géomètre éminent, dont l'œuvre est d'une clarté éblouissante et bien française." (See also *1921*, 237)].

REVUE SCIENTIFIQUE, volume 59, February 12, 1921: "Le mathématicien Georges Humbert" by G. Lemoine, 88–89.

SCHOOL SCIENCE AND MATHEMATICS, volume 21, March, 1921: "Mathematical ability as related to general intelligence" by B. R. Buckingham, 205–215; Problems and solutions, 280–284.

SCIENCE, new series, volume 53, April 1, 1921: "National temperament in scientific investigations" by R. D. Carmichael, 298–301 [Fourth paragraph from the end: "Of the three countries which have led in scientific development it seems to be the impartial verdict of history that we owe to France the largest number of works perfect in form and substance and classical for all time; that the greatest bulk of scientific work, at least in more recent decades, has been produced in Germany; but that the new ideas which have fructified science, in earlier times and also in the nineteenth century, have arisen more frequently in Great Britain than in any other country."]; "The American Association for the Advancement of Science, Section L—History of Science sessions" by F. E. Brasch, 315–318—April 22: "Sherburne Wesley Burnham, 1838–1921" by E. B. Frost, 373–377 [see this MONTHLY, *1921*, 236–237].

SCIENTIA, volume 29, March, 1921: "Les contributions des différents peuples au développement des mathématiques. I$^{\text{ère}}$ partie: Evènements mémorables et hommes représentatifs dans l'histoire des mathématiques" by G. Loria, 169–184; Review by G. Scorza of L. D. Weld's *Theory of Errors* (New York, 1916) and J. Hadamard's *Four Lectures on Mathematics delivered at Columbia University* (New York, 1915), 220–221.

SCIENTIFIC AMERICAN, volume 124, February 19, 1921: "The new concepts of time and space. A brief account of what Einstein has done to these fundamental notions" by M. Francis, 146–147, 155, 157—March 12, 1921: "The Einstein prize winner," 207 [Lyndon Bolton, autobiographical sketch and portrait; "I was born in Dublin in 1860, but I have lived in England since 1869. My family belonged to the landed gentry class, but I owe nothing to wealth or position. . . . After taking my degree (at Cambridge) in 1883 as a wrangler, I taught science and mathematics at Wellington College but I was attracted by what I had heard of the Patent Office and I entered it through open competition in 1885" (compare *1921*, 191)].

SCIENTIFIC AMERICAN MONTHLY, volume 3, March, 1921: "Leonardo da Vinci as an inventor. Remarkable achievements in sciences and invention of the great Italian artist" by A. A. Hopkins, 263–265.

SCIENTIFIC MONTHLY, volume 12, no. 4, April, 1921: "The history of physics" by H. A. Bumstead, 289–309 [First paragraph: "The beginnings of anything like a connected history of the science which is now called physics may be placed with considerable definiteness about the beginning of the 17th century and associated with the great name of Galileo. It is of course true that innumerable isolated facts had been known for many centuries which are now included among the data of this science; and many tools and simple machines which are now regarded as applications of physical principles had been devised and used. Even prehistoric man knew some of these—to his very great advantage. But, with one important exception which will be mentioned later, there was, in the ancient world, no connected body of knowledge in this field which can properly be called scientific. In this respect physics differs radically from mathematics, or astronomy, natural history, or medicine, each of which began its modern career with a store of scientific knowledge that had been obtained and put in order before the Renaissance."]; "Perfect and amicable numbers" by L. E. Dickson, 349–354 [First paragraph: "The two types of numbers in our title have had a continuous history extending from the early Greeks to date, and may be justly called the most human of all numbers. To them were early attributed certain social qualities, and later also ethical import, while mystics of the middle ages believed that they possessed special powers as talismans. Continuously for twenty centuries a wide-spread interest has been taken in the purely numerical questions and puzzle problems which arose in the study of these remarkable numbers. We shall present here the more essential facts and fancies in the quaint history of these most human of all numbers."].

Sphinx-Œdipe, volume 15, October, 1920: "Sur le folium double" by G. Loria, 1–4—November: "Sur les nombres qui sont, de n façons, la somme de trois bicarrés" by R. Goormaghtigh, 161–162; "Une illusion de Fermat" by L. Aubry, 162–163—December: "Résumé de la conférence générale de M. L. E. Dickson," 177–178; "Errata dans les tables de facteurs linéaires des formes $x^2 \pm Dy^2$" by P. Poulet, 180–181—Volume 16, February, 1921: "Sur les carrés d'Euler" by A. Margossian, 17–21; "Deux nombres curieux" by V. Thebault, 21 [$567^2 = 321489$ and $854^2 = 729316$]; "Au sujet d'une description du folium double due à J. B. Suardi et retrouvée par M. Gino Loria" by R. Goormaghtigh, 22–23—March: "Notice sur Charles Ange Laisant" (à suivre), 33–36; Review by H. Brocard of R. C. Archibald's "Notes on the logarithmic spiral, golden sections and the Fibonacci series" (New Haven, Conn., 1920).

The Times Literary Supplement, London, volume 19, December 30, 1920: "Correspondence—First use of the decimal point" by J. D. White, 891 [The letter: "Sir,—With reference to my letter on 'The First Use of the Decimal Point,' in *The Times Literary Supplement* of September 9, [cf. this Monthly, *1921*, 83], Professor Florian Cajori, of Colorado College, has kindly written to me, quoting from the Second Edition of his *History of Mathematics* (1919) this passage:

"'Historians of Mathematics do not yet agree to whom the first introduction of the decimla point or comma should be ascribed. Among the candidates for the honour are Pellos (1492), Bürgi (1592), Pitiscus (1608, 1612), Kepler (1616), Napier (1616, 1617). This divergence of opinion is due mainly to different standards of judgment. If the requirement made of candidates is not only that the decimal point or comma was actually used by them, but that they must give evidence that the numbers were actually decimal fractions, that the point or comma was with them not merely a general symbol to indicate a separation, that they must actually use the decimal point in operations including multiplication or division of decimal fractions, then it would seem that the honour falls to John Napier, who exhibits such use in his 'Rabdologiæ,' 1617. Perhaps Napier received the suggestion for this notation from Pitiscus, who, according to Eneström, uses the point in his 'Trigonometria' of 1608 and in 1612, not as a regular decimal point, but as a more general sign of separation.'

"Francis Pellos, the first of the writers thus mentioned, was the author of a work in the dialect of Nice, entitled 'Sen Segue de la Art de Arithmeticha,' which was published at Turin in 1492—the year that Columbus discovered America, and within fifty years of the first printing from movable types. An examination of the copy of this rare work in the British Museum Library shows that on pp. 10–12 Pellos gives the following, among other examples, of the method of division 'per una figura' and 'per desenals he centenals.' In the first case the divisor, dividend, and quotient are arranged as here shown, and I have set out the others in the same form, the figures, of course, being as in the original work:

$$\begin{array}{c} 5)\underline{5789657} \\ 1157931\frac{2}{5} \end{array} \qquad\qquad \begin{array}{c} 30)\underline{583604.3} \\ 194534\frac{23}{30} \end{array} \qquad\qquad \begin{array}{c} 400)\underline{78965.73} \\ 19741\frac{173}{400} \end{array}$$

"It will be seen that Pellos—as he explains in the text—uses the point for marking off from the dividend as many figures as there are 0's at the end of the divisor, so as to assimilate, for instance, division by 400 to division by 4; but he can hardly be said to use it as a true decimal point for separating the integers from the decimals in the expression of a quantity, and he states the remainder as a fraction of the original divisor.

"Stevinus introduced the operative use of decimals in 1585, and they were also used operatively by Bürgi in 1592, and Beyer in 1603. Both Stevinus and Beyer indicated the last integer and the first, second, &c., decimal figures by placing after or above them as exponents the numbers 0, 1, 2, &c. (a notation probably suggested by that which had long been used for sexagesimal fractions and survives in the marks for minutes and seconds), and even Bürgi, who thought it sufficient to place an 0 underneath the last integer, failed to attain 'the elegant simplicity' of the decimal point.

"Pitiscus, as shown in my previous letter, appears to have been the first to use the decimal point for separating the integers from the decimals in expressions of quantity. But he does not appear to have used it operatively; the evidence indeed is rather the other way. In the tables to both the second and the third editions of his 'Trigonometria' (1608, 1612) he gives, for instance, the sine of 30° 20′ to radius 100,000 as 50502.98; but in the example (at the beginning of book 3 in both these editions) of ascertaining the length of the sine of this angle for a radius of 24 ft., he takes the sine as 5050298 to radius 10,000,000, and states the result as $12\,\frac{1207152}{10000000}$.

"The decimal point was not used in the original Latin edition of Napier's 'Descriptio' of 1614, but it was used in the English edition of 1616, as described in my previous letter. In neither edition, however, is there an example of its operative use. But in Napier's 'Rabdologiæ,' Edinburgh, 1617, bk. 1. ch. 4, the description of the use of the numbered rods, commonly called Napier's Bones, in compound division is followed by an 'Admonitio pro Decimali Arithmetica,' in which Napier refers to Stevinus's Decimal Arithmetic, and says—to quote the translation in Mr. Macdonald's book mentioned below—

"'Since there is the same facility in working with these fractions as with the whole numbers, you will be able, after completing the ordinary division, and adding a period or comma, as in the margin, to add to the dividend or to the remainder one cypher to obtain tenths, two for hundredths, three for thousandths, or more afterwards as required; and with these you will be able to proceed with the working as above' . . .

"In the margin is the example of dividing 1180 by 432 (sic), with the result stated as 1993,273 which, as he explains, is equivalent to $1993\frac{273}{1000}$ or $1993, 2' \, 7'' \, 3'''$. This is probably the earliest printed instance of the operative use of decimals with the decimal point, or its equivalent, the decimal comma.

"In Napier's 'Constructio,' with Notes by Briggs, which was printed in 1619 after Napier's death, decimals are both described and used operatively with the decimal point, strictly so called. Mr. W. R. Macdonald, in his translation with notes (1889) of the 'Constructio,' makes special reference to this feature on pp. 88, 89, setting out the above quoted passage from 'Rabdologiæ' (1617), and observing that it is interesting as Napier's first published reference to decimal arithmetic, though sections 4, 5, and 47 of the 'Constructio' which deal with it 'must have been written long before that date.'"]

UNDERGRADUATE MATHEMATICS CLUBS.

All reports of club activities should be sent to E. L. Dodd, 3012 West Ave., Austin, Texas

CLUB ACTIVITIES.

THE MATHEMATICS CLUB OF ALBION COLLEGE, Albion, Michigan.

[*1918*, 354; *1919*, 409.]

Officers, elected each semester in 1919–20 and 1920–21, were as follows: Presidents, Esther Pearl '20, Joyce Hadaway '20, Elizabeth Gordon '21, Gertrude Pratt '21; vice-presidents, Joyce Hadaway '20, Harland Hatch '20, Gertrude Pratt '21, Mary Hutchins '21; secretary-treasurers, Almira Priest '20, Almira Priest '20, Mary Hutchins '21, Harold Black '23; third member of program committee, Elizabeth Gordon '21, Clark Dean '21, Christine Niemann '21, Marie de Vries '21.